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BATS AND THEIR ROOSTS IN CLEVELAND AND NORTH EAST YORKSHIRE II: OCCASIONAL RECORDS OF THE PIPISTRELLE AND THE BROWN LONG-EARED BAT

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Aspects of the status and distribution of bats, in particular their roosts, in Cleveland county and adjacent parts of North Yorkshire have been described previously (Wardhaugh 1992). This note provides data on individual bats found away from known roosts sites, typically exhausted, injured or freshly dead animals. Two species are involved, the pipistrelle (*Pipistrellus pipistrellus*) and the brown long-eared bat (*Plecotus auritus*). In the case of the former, records date from 1984 to February 1993 and for the latter, from 1975 to 1992. Distribution is shown in Figures 1 and 2, the exact boundary of the study area being indicated in Figure 3.

Several points of interest arise from these data. For 31 of the 33 pipistrelles involved, sex was recorded, there being 23 males and 8 females, a statistically significant bias (chi squared = 7.528 $P < 0.01$). It is not easy to suggest a reason why males should be more prone to displacement or injury but it could be due to this sex more frequently having to

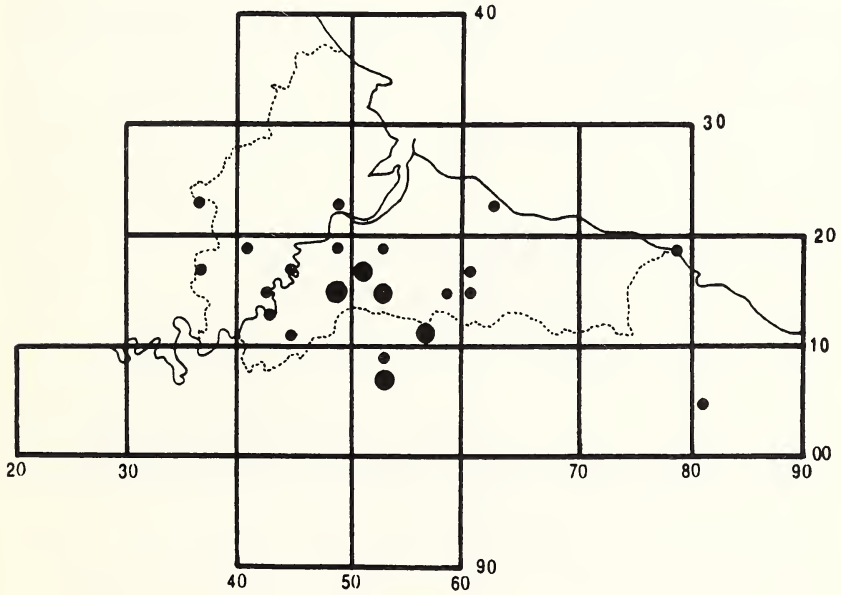

FIGURE 1
Tetrad distribution of records of individual pipistrelles in Cleveland and north east Yorkshire. Cleveland county boundary (dotted line) and the River Tees are shown.
• = one individual ● = two to five individuals.

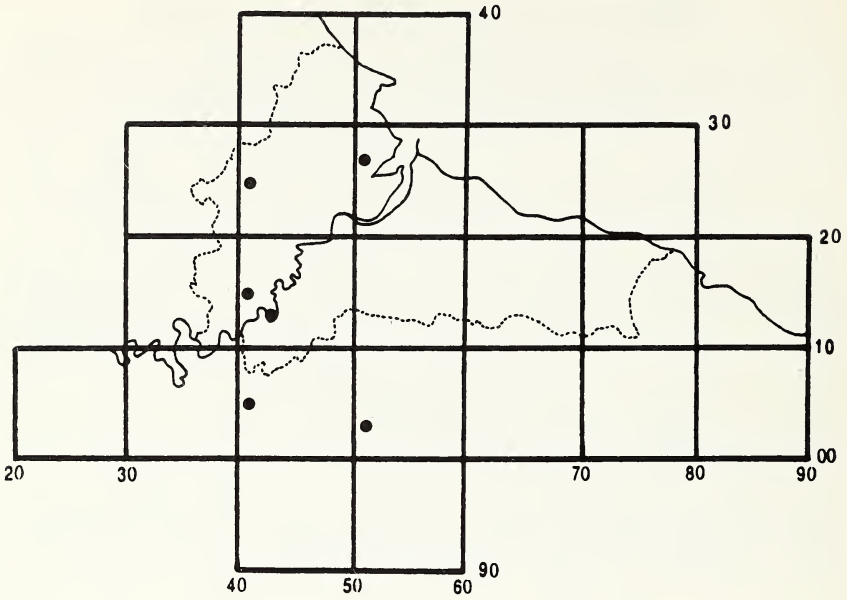

FIGURE 2
Tetrad distribution of records of individual brown long-eared bats in Cleveland and north-east Yorkshire. Cleveland county boundary (dotted line) and the River Tees are shown.

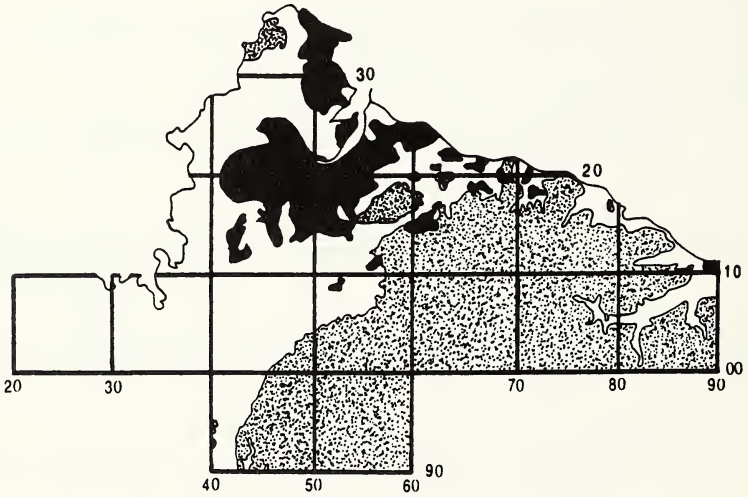

FIGURE 3
Sketch map showing the boundary of the study area. Urban land is shown in black (defined as areas of housing, industrial or other similar land of greater than 1 km^2 in area). Stippled areas are those 100m or more above sea level.

follow what is known as an adaptive risk prone strategy (Stephens 1981). That is, during adverse weather and hence poor feeding conditions, a bat may face death by starvation if it remains in torpor at its roost. In this situation it is better to become active and perhaps encounter feeding conditions which yield a net energy gain than to remain inactive and inevitably die. It could be that males face this dilemma more frequently than do females due to the former having a smaller mass (Avery 1991) and consequently a greater surface area to volume ratio, resulting in more rapid heat loss. Further circumstantial evidence in support of this hypothesis includes the fact that a significant cause of mortality in hibernating greater horseshoe bats (*Rhinolophus ferrum-equinum*) is starvation at the end of winter (Ransome 1990). Also, in a study of pipistrelle winter feeding activity in the Cambridge area, Avery (1985) noted that males from three roosts emerged to feed more often than did females at this time of year. On this basis one might expect displaced and injured pipistrelles to be encountered more frequently in winter and perhaps early spring. However, in the present study there was a statistically significant bias towards the months June to August inclusive, sixteen bats being recorded for this quarter and seventeen for the rest of the year (chi squared = 9.71 $P < 0.01$). For males there were thirteen records for June to August and ten for the rest of the year (chi squared = 12.18 $P < 0.001$). This is the period when young are born, normally from mid-June to mid-July, reaching independence from mid-July onwards (Avery 1991), whilst adult males begin to defend harems from July onwards (Gerrel & Lundberg 1985). Thus future studies should concentrate on whether individuals recorded at this time of year are adults or juveniles.

If, as appears to be the case, males are more prone to displacement and injury, then one might expect the sex ratio among adults to be unequal, something which would be very difficult to determine, given the elusiveness of both sexes during hibernation and their differing behaviour during the summer months, when females congregate, often in groups of a hundred of more, to form nursery colonies, whilst males remain much more dispersed. For the brown long-eared bat, Stebbings (1970) reported a differential survival rate between sexes, males 0.54 and females 0.76, indicating life spans of 7 and 16 years respectively. A similar bias was noted in the grey long eared-bat (*Plecotus austriacus*). Information on adult sex ratios and survival rates in the pipistrelle seems to be lacking. However, the sex ratio among juveniles was found to be equal in one study (Stebbings 1968).

Regarding distribution, three patterns emerge, especially if data for roost sites are included (Wardhaugh 1992). Firstly, there is a very marked tendency for the pipistrelle to occur in urban areas as opposed to open countryside or small rural villages (Table 1, Figures 1 and 3). The pipistrelle is very dependent on houses and other buildings for roost sites, both nationally (Avery 1991) and in this study area (Wardhaugh 1992). However, this association could be due, at least in part, to both roosts and displaced individuals coming to light more readily in densely populated areas. In general, the inevitably opportunistic manner in which this type of information on distribution is accumulated does make it more difficult to evaluate. Further points of interest are a paucity of records for areas above an altitude of 100m (Table 2) and a possible tendency for this species to avoid areas less than 5km from the coast (Table 3). Both of these effects could be due to one or more of a number of factors such as aspects of climate or the availability of food or roost sites. Moreover, the three effects noted could have related causes, not least because urban areas and land over 100m are almost mutually exclusive in the study area. Much of the latter is open and uninhabited, for example heather moorland, with few buildings or other potential roost sites. Consequently it is difficult to evaluate the relative importance of the effects noted.

For the brown long-eared bat, just six individuals are reported here (Figure 2) but eleven roost sites have ben located (see Wardhaugh 1992 for the distribution of these). This species is generally considered to be sedentary in its habits (Swift 1991) so it is probably reasonable to treat all these records as a single group for statistical purposes. The close correlation in patterns of occurrence between individual pipistrelles and their roosts, a point of interest in itself, perhaps lends some support to this procedure.

TABLE 1
Association between land use and occurrence of bats

Land* use	Land area		Pipistrelle occasional		Pipistrelle roosts		Brown long-eared bat all records	
	km^2	(%)	no.	(%)	no.	(%)	no.	(%)
Urban	201	(12.2)	22	(66.7)	31	(63.3)	3	(17.6)
Rural	1444	(87.8)	11	(33.3)	18	(36.7)	14	(82.4)
Totals	1645	(100)	33	(100)	49	(100)	17	(100)
Statistical significance			chi squared = 82.8 P < 0.001		chi squared = 105.1 P < 0.001		not significant	

* Urban land is defined as areas of housing, industrial or similar land, greater than one square km in area.

TABLE 2
Association between altitude and occurrence of bats

Altitude	Land area		Pipistrelle occasional records		Pipistrelle roosts		Brown long-eared bat all records	
	km^2	(%)	no.	(%)	no.	(%)	no.	(%)
Below 100m	935	(56.8)	31	(93.9)	48	(98.0)	14	(82.4)
Above 100m	710	(43.2)	2	(6.1)	1	(2.0)	3	(17.6)
Totals	1645	(100)	33	(100)	49	(100)	17	(100)
Statistical significance			chi squared = 18.3 P < 0.001		chi squared = 33.2 P < 0.001		chi squared = 4.49 P < 0.05	

TABLE 3
Association between distance from the coast and occurrence of bats

Distance from coast	Land area		Pipistrelle occasional records		Pipistrelle roosts		Brown long-eared bat all records	
	km^2	(%)	no.	(%)	no.	(%)	no.	(%)
Under 5km	265	(16.1)	2	(6.1)	2	(4.1)	3	(17.6)
Over 5km	1380	(83.9)	31	(93.9)	47	(95.9)	14	(84.2)
Totals	1645	(100)	33	(100)	49	(100)	17	(100)
Statistical significance			not significant		chi squared = 5.20 P < 0.05		not significant	

In contrast to the pipistrelle, the brown long-eared bat does not seem to show a preference for urban areas (Table 1). This point demonstrates that the observed association of the pipistrelle in this respect is likely to be at least in part genuine and not solely a consequence of the process of data collection, as outlined above. These findings are in accordance with the stated habitat preferences of these two species in Britain (Avery 1991, Swift 1991), although available information seems to be principally anecdotal. Like the pipistrelle, the brown long-eared bat shows a tendency, albeit less marked, to occur at altitudes below 100m (Table 2) but there is no evident avoidance of coastal areas (Table 3). The former point contrasts with the situation in central and eastern Europe, where this species is said to be confined to mountainous woodland areas (Horacek 1975).

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I am grateful to members of Cleveland Bat Group, both past and present, for their help in providing data included in this paper. In addition, I wish to thank R. T. McAndrew for supplying records of two brown long-eared bats.

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THE ACULEATE WASPS AND BEES (HYMENOPTERA: ACULEATA) OF DUNCOMBE PARK IN WATSONIAN YORKSHIRE

MICHAEL E. ARCHER

Duncombe Park has been found to be a good locality for aculeate wasps and bees, having 85 recorded species, six species of national importance and five species of regional significance.

Duncombe Park is situated near Helmsley, North Yorkshire (VC 62; SE6083). Duncombe Park is an extensive area of ancient parkland and deciduous woodland. Large numbers of very old oak, ash, beech, lime and field maple trees are present. Formerly wych elm was present but now has been felled because of Dutch Elm disease. The presence of much dead wood in sunny situations provides nesting sites for aerial nesters. Flowering shrubs, e.g. hawthorn, and flowery grassland and wet land near the river provide important nectar and pollen resources besides prey for the wasp species. Geologically the site is situated on Corallian strata and Oxford clays. In places clay banks are present, some bare

or thinly vegetated, which in sunny situations provide nesting sites for subterranean nesters.

Between 1985 and 1990 13 visits to Duncombe Park were made. These visits were distributed throughout the year as follows: April (1 visit), May (3), June (3), July (3), August (2), September (1). During these visits, which normally lasted for about three hours, all species of aculeate wasps and bees seen were recorded (Archer sample) and usually collected with a hand net for identification. In addition, I have had access to a small number of records from P. Kendall (June 1983), J. H. Flint (May, July 1980) and R. J. Marsh (Sept. 1985) and a large number of records from P. Skidmore (June 1979, July 1983) and J. H. Burns (July 1981, June & July 1983), to whom I am most grateful; thanks are also due to the Duncombe Park Estates (Lord Faversham and his agent Mr. I. N. Saggers) for allowing access. In the following account biological names are according to Kloet and Hincks (1978).

Species Present at Duncombe Park

At the family level the taxonomic distribution of species is given in Table 1 for Duncombe Park and Watsonian Yorkshire (Archer, 1993). Of the aculeate wasps and bees recorded from Watsonian Yorkshire, about one-third (32.1%) have been found at Duncombe Park. In addition, J. T. Burn recorded the dryinid *Anteon brachycerum* during June 1983.

TABLE 1
The number of species of aculeate wasps and bees recorded from Duncombe Park and Watsonian Yorkshire.

Family	No. species	
	Duncombe Park	Yorkshire
Solitary wasp species:		
Chrysididae	6	16
Tiphiidae	0	2
Mutillidae	1	2
Sapygidae	1	2
Pompilidae	1	21
Eumenidae	4	13
Sphecidae	27	73
Total Solitary Wasps	40	129
Solitary bee species:		
Colletidae	1	9
Andrenidae	9	35
Halictidae	9	27
Melittidae	0	1
Megachilidae	4	13
Anthophoridae	6	19
Total Solitary Bees	29	104
Social wasp & bee species:		
Vespidae	5	7
Apidae	10	22
Total Social Species	15	29
Total Species	84	262

The Archer sample of solitary wasps and bees consists of 199 records derived from 62 species (Table 2). Forty-three species (69.4%) were recorded on one, two or three days

(unusual species) while the other 19 species (30.6%) were recorded on from four to 12 days (common species) (Table 3). Solitary species recorded at Duncombe Park but not in the Archer sample were: *Sapyga clavicornis, Symmorphus mutinensis, Crossocerus binotatus, Ectemnius ruficornis, Rhopalum clavipes, R. coarctatum* and *Passaloecus insignis.*

TABLE 2
The number of records and species of solitary wasps and bees recorded from Duncombe Park in the Archer sample.

Family	No. species	No. records
Chrysididae	6	19
Mutillidae	1	1
Pompilidae	1	6
Eumenidae	3	5
Sphecidae	22	79
Colletidae	1	2
Andrenidae	9	35
Halictidae	9	30
Megachilidae	4	14
Anthophoridae	6	18

TABLE 3
The number of days on which each species of solitary wasp and bee was recorded at Duncombe Park in the Archer sample.

No. Records	No. days	Species	No. species
20	1	*Chrysis rutiliventris, Omalus violaceus, Myrmosa atra, Ancistrocerus parietum, Crossocerus ovalis, C. walkeri, Trypoxylon figulus, Pemphredon morio, P. inornata, Andrena fucata, A. fulva, A. saundersella, Halictus tumulorun, Lasioglossum nitidiusculum, L. fratellum, Anthophora plumipes, Nomada marshamella, N. flavoguttata, N. panzeri, N. ruficornis.*	20
30	2	*Chrysis angustula, Ancistrocerus parietinus, A. trifasciatus, Crossocerus elongatulus, C. leucostoma, C. podagricus, Psenulus pallipes, Passaloecus corniger, Hylaeus communis, Andrena nigroaenia, A. helvola, Lasioglossum fulvicorne, L. albipes, Osmia leaiana, Megachile willugbiella.*	15
24	3	*Chrysis ignita, Crossocerus pusillus, Ectemnius continuus, Psen dahlbomi, Andrena subopaca, Lasioglossum rufitarse, Osmia rufa, Nomada fabriciana.*	8
20	4	*Trichrysis cyanea, Crossocerus quadrimaculatus, C. annulipes, C. megacephalus, Mellinus arvensis.*	5
5	5	*Ectemnius cephalotes.*	1
18	6	*Dipogon subintermedius, Andrena scotica, Lasioglossum cupromicans.*	3
35	7	*Trypoxylon clavicerum, Ectemnius cavifrons, Halictus rubicundus, Lasioglossum calceatum, Chelostoma florisomne.*	5
16	8	*Chrysis impressa, Pemphredon lugubris.*	2
9	9	*Andrena chrysosceles.*	1
10	10	*Andrena haemorrhoa.*	1
12	12	*Crossocerus cetratus.*	1

The following social wasp and bee species have been recorded: Vespidae: *Dolichovespula sylvestris*, *Vespula austriaca*, *V. rufa*, *Paravespula germanica*, *P. vulgaris*; Apidae:– *Bombus lucorum*, *B. terrestris*, *B. lapidarius*, *B. pratorum*, *B. hortorum*, *B. pascuorum*, *Psithyrus bohemicus*, *P. campestris*, *P. sylvestris*, *Apis mellifera*.

Seasonal Progression of Solitary Species

From the Archer sample the number of solitary species recorded in each month and the new species seen each month are given in Table 4. The most productive months for numbers of species were July and August and for new species May and July.

TABLE 4

The number of species of solitary wasp and bee recorded per month and new species seen each month at Duncombe Park from the Archer sample.

	April	May	June	July	August	September
No. species	2	23	24	36	30	13
No. new species	2	21	10	23	6	0

The spring fauna only consists of the subterrranean nesting bees. The most noticeable species are the *Andrena* bees with their *Nomada* cleptoparasites. The cleptoparasite digs into the nest of its host and lays her egg. This egg on hatching destroys the egg or young larva of its host and proceeds to feed on the food stores of its host. Some of the *Andrena* bees, e.g. *A. chrysosceles*, *A. haemorrhoa* and *A. scotica*, can appear in large numbers. *Andrena* and *Nomada* species are normally gone by the end of June although a few last into July and *A. subopaca* survives until August.

The long-cycle species of *Halictus* and *Lasioglossum* also appear in the spring and persist often until September. Some of these species are commonly found, e.g. *H. rubicundus*, *L. calceatum* and *L. cupromicans*. The cleptoparasites of these bees belong to the genus *Sphecodes* but strangely none have been found as yet.

The large bumblebee-like *Anthophora plumipes* also appears in the spring and because of its size is very noticeable, particularly visiting flowers in the front gardens of the houses near Duncombe Park.

The summer fauna, which consists of all the species of wasps and the remaining species of bees, start to appear from the end of May into June although *Osmia rufa* has been recorded from the middle of May. Only one spider-hunting wasp has been found, *Dipogon subintermedius* (=*D. nitidus*), which is commonly seen moving quickly over the surface of dead wood. Several aerial nesting mason wasps are recorded with their cleptoparasites: *Chrysis* species, of which *C. impressa* is particularly noticeable when it lands on dead wood in sunny situations. The sphecid wasps recorded are mainly aerial nesters and the following are particularly common on dead wood, either as females travelling back and forth from their nest entrances or males looking for females:– *Trypoxylon clavicerum*, *Crossocerus cetratus*, *Ectemnius cavifrons* and *Pemphredon lugubris*. The only cleptoparasites these sphecids suffer from are *Trichrysis cyanea* and the rare *Omalus violaceus*.

The summer bee fauna mainly consists of the aerial nesting Megachilids. *Chelostoma florisomne* is often found, with, less frequently, its cleptoparasite *Sapyga clavicornis*. The only subterranean nesting bee is *Hylaeus communis*, which is a crevice nester nesting in many kinds of cavities, some of which may not be subterranean.

Quality Assessment of Solitary Species at Duncombe Park

Six species found at Duncombe Park are nationally scarce species (Falk, 1991). One species, *Crossocerus leucostoma*, which is an A category scarce species, reaches its southern boundary of its British distribution in Watsonian Yorkshire (Archer, 1985). The other five species, which are B category scarce species, are either at the northern boundary of their distribution (*Omalus violaceus*, *Sapyga clavicornis*, *Ectemnius ruficornis*,

Pemphredon morio) or are more widespread in Britain (*Crossocerus walkeri*). All six species are dependent on dead wood in sunny situations as nesting sites, and in this respect Duncombe Park is very important.

The 69 species of solitary wasps and bees can be considered to have a common, frequent, occasional or rare status in the context of Watsonian Yorkshire (Archer, 1993) (Table 5). The five rarities are the same as the national scarce species, except for *Ectemnius ruficornis* which has a frequent status in Watsonian Yorkshire.

TABLE 5
The coding of the 69 species of solitary wasps and bees recorded from Duncombe Park.

Status	No. species
Common	38
Frequent	18
Occasional	8
Rare	5

By giving species a score depending on the above status, a quality score of 200 can be calculated for Duncombe Park (Table 6). Dividing the quality score by the 69 species of solitary wasps and bees gives a species quality score of 2.9. A species quality score of two or more (Foster & Eyre, 1992) indicates a good quality locality.

TABLE 6
The quality score of the species of solitary wasps and bees recorded at Duncombe Park.

Status	Status Score (A)	No. species (B)	Quality Score (A*B)
Common	1	38	38
Frequent	2	17	34
Occasional	4	8	32
Rare	8	0	0
Nationally Scarce	16	6	96

Cleptoparasitic Load

The cleptoparasitic load (CL) is the percentage of aculeate species that are cleptoparasites on other host aculeates (Table 7). The CLs for the species of solitary wasps and bees are of a similar value.

TABLE 7
The relative frequency of the cleptoparasitic species among the solitary wasps and bees from Duncombe Park.

	No. hosts (H)	No. cleptoparasites (C)	Cleptoparasitic Load CL=100*C/(H+C)
Solitary wasps	32	8	20.0
Solitary bees	24	5	17.2

Aerial Nester Frequency

The aerial nester frequency (AF) is the percentage of host aculeate species that have aerial nest sites. Aerial nests are often in old beetle burrows in dead wood or the central cavities of stems such as those of bramble. Subterranean nesters nest in the soil, usually in burrows dug by themselves but sometimes in crevices or pre-formed burrows (Table 8). Most of the species of solitary wasps are aerial nesters while the species of solitary bees are mainly subterranean nesters.

TABLE 8
The nesting habits of the host solitary wasp and bee species from Duncombe Park.

	No. aerial nesters (A)	No. subterranean nesters (S)	Aerial nester frequency AF=100*A/(A+S)
Solitary wasps	27	5	84.4
Solitary bees	4	20	16.7

DISCUSSION – QUALITY ASSESSMENT

At present Duncombe Park is the only site characterised by clay soil and dead wood nesting sites with aculeate species that has been studied in Watsonian Yorkshire. In order to carry out a quality comparison it is necessary to consider the heathland Commons of the Vale of York (Archer, 1992b). These Commons are characterised by having sandy soil and, except for coniferised Allerthorpe Common, dead wood nesting sites (Table 9).

TABLE 9
A comparison of the quality scores between the three heathland Commons of the Vale of York and Duncombe Park based on the species of the solitary wasps and bees.

	Strensall	Duncombe Park	Coniferized Allerthorpe	Skipwith
No. species	91	69	75	69
No. Yorkshire rarities	5	5	2*	2*
No. national rarities	6	6	3	2
Quality score	289	200	212	149
Species quality score	3.2	2.9	2.8	2.2

*Corrections to Archer, 1993

The species quality of Duncombe Park is similar to that of coniferised Allerthorpe Common but with fewer species is similar to Skipwith Common. In terms of national and Yorkshire rarities Duncombe Park is similar to Strensall Common. The relatively high number of national and Yorkshire rarities raises the quality and species quality scores of Duncombe Park to those of coniferised Allerthorpe Common despite the smaller number of species.

CLEPTOPARASITIC LOADS

Wcislo (1987) showed that the amount of parasitic behaviour among aculeate Hymenoptera correlated with geographical latitude, being higher in the temperate compared with the tropical regions. As such CLs for sites in Britain should have similar values. Table 10 shows the CLs for the three heathlands of the Vale of York with three

TABLE 10
A comparison of the cleptoparasitic loads and nesting habits of the solitary wasps and bees between Duncombe Park and six other localities.

	Cleptoparasitic Loads		Aerial Nester Frequencies	
	Wasps	Bees	Wasps	Bees
Duncombe Park	20.0	17.2	84.4	16.7
Coniferized Allerthorpe	13.9	35.9	20.0	8.0
Skipwith	13.2	35.5	42.4	30.0
Strensall	18.0	35.0	41.5	19.2
Bernwood Forest	12.5	32.0	85.7	23.5
Charnwood Forest	18.1	27.0	71.2	22.2
Leicester garden	17.6	18.9	92.9	36.7

other sites for comparison with Duncombe Park. Bernwood Forest, near Oxford, is characterised by clay soil and dead wood nest sites (Archer, 1988), Charnwood Forest in Leicestershire by sandy soil and dead wood nesting sites but is at a higher altitude (Archer, 1992a) and the Leicester garden by dead wood nesting sites but with disturbed non-sandy soil condition (Archer, 1990b).

The CLs of the solitary wasps do all have a similar value (range 12.5-20.0) as do the solitary bees (range 27.0-35.9) except for the Leicester garden and Duncombe Park which have lower values. The low value of the CL for the solitary bees from Duncombe Park is due to the failure to find cleptoparasites of the genus *Sphecodes*. This is rather surprising as some of the host species, *Halictus rubicundus*, *Lasioglossum calceatum* and *L. cupromicans*, are often encountered (Table 3). The higher CL for the solitary bees versus the solitary wasps is a function of the British fauna (Archer, 1990a).

Aerial nester frequency

Table 10 shows the AFs of six sites for comparison with Duncombe Park. AFs vary greatly for the solitary wasps (20.0-92.9) and solitary bees (8.0-36.7). Thus Duncombe Park shows a relatively high value for the solitary wasps and an average value for the solitary bees. The value of the AF is clearly increased when dead wood nesting sites are present but also is increased when the site lacks a sandy soil (Duncombe Park, Bernwood Forest, Leicester garden), has disturbed soil conditions (Leicester garden) or exists at a higher altitude (Charnwood Forest). To explain these relationships it is hypothesized that sandy soils are more easily dug by solitary aculeate wasps and bees to make nests than non-sandy soils. Sandy soils also warm up more quickly so extending the period of wasp and bee activity. At higher altitudes with reduced average temperature and amounts of sunshine, aerial nesting sites are likely to be warmer for a longer time than subterranean sites.

The higher AFs for solitary wasps compared with solitary bees is a function of the British fauna (Archer, 1990a) but also it is known that the activity of solitary wasps is more affected by weather conditions than solitary bees (Archer, 1990b). The absence of solitary wasps in the spring fauna when the weather is cooler at Duncombe Park would reinforce this observation.

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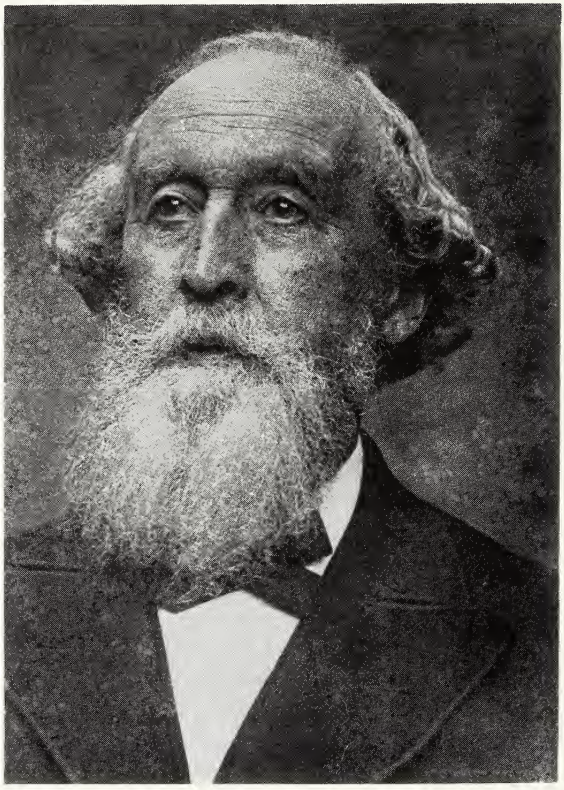
A PORTRAIT OF THOMAS BUNKER OF GOOLE

MARTIN LIMBERT

Museum & Art Gallery, Doncaster, DN1 2AE



Thomas Bunker in 1898. Photographer unknown.

In a 1989 a paper was published (*Naturalist* **114**: 93-97) which presented biographical data on the first recorders of the Goole Scientific Society, which existed from 1875 to *c.* 1894 (with coverage by minute books for 1875-86). Particular attention was paid to Thomas Bunker, the Society's recorder for vertebrate zoology, especially his contribution to natural history in Yorkshire. Outline details of other aspects of his life were also presented.

Although originally a denizen of Bedfordshire, he lived in Goole for much of his life, coming to the town to take up a post as a schoolmaster in the National Schools. Thomas and Sarah Sophia Bunker, who were married in Goole *c.* 1864, had three sons and three daughters. The second son, Joseph Tite Bunker, was drowned on his way to the Klondyke in 1899 (*Goole Times*, 25 August 1899), and one of the daughters died in infancy. Sarah Sophia Bunker, a native of Staffordshire, died in 1921 (*Goole Times*, 13 May 1921).

Thomas Bunker took an active interest in the educational and scientific life of Goole and beyond. In addition to his duties at the National Schools, and his loyal membership of both the Goole Scientific Society and the Yorkshire Naturalists' Union, he opened a private day school in 1857, and was also associated with the Gilchrist Educational Trust lectures in the town (e.g. *Goole Weekly Times*, 21 February 1890).

Although Bunker probably lectured regularly to organisations, he was, by contrast, not a prolific writer; much of his output appeared locally or in the *Naturalist,* although he wrote on one occasion for the *Zoologist* (**8** (third ser.): 483-484). This was a description of the capture at Goole of Yorkshire's only Sei Whale *Balaenoptera borealis*. The event was also documented in the *Naturalist* (**10**: 87-88) and – at much greater length – in the *Goole Weekly Times* (12/19 September and 3 October 1884).

At the time of the 1989 paper, the only known photographic likeness of Thomas Bunker was that which appeared in his *Naturalist* obituary in 1915 (**40**: 176-177). Subsequently, it was learned that plate VIIA ('Yorkshire Naturalists at Filey') in the *Naturalist* for 1903 (**28**: opposite page 241) includes Thomas Bunker. It is reproduced in C. G. Varty, *Yorkshire Naturalists' Union Protection of Birds Committee Centenary Year 1891-1991* ([Otley] 1991), with Bunker indicated *inter alia*. Two further photographs are now known to survive. Both were the property of Sophia J. Jordan, a grand-daughter of Thomas Bunker; she died in 1991. One is a small portrait of Bunker by Barry of 7-8, Park Street, Hull, which was clearly taken at the same time as the photograph accompanying Bunker's *Naturalist* obituary. The second is that reproduced here. It is an imposing full-plate portrait with regrettably minimal documentation; it dates from 1898, when Bunker was *c.* 68 years of age.

ACKNOWLEDGEMENT

I would like to thank Clive Varty for his timely intercession which probably saved the 'Jordan' photographs from an uncertain future, and for initially recognizing Thomas Bunker on the 1903 photograph taken at Filey.

BOOK REVIEWS

The Whitehead Encyclopedia of Deer by **G. Kenneth Whitehead.** pp. xii-597 with numerous monochrome photographs, line drawings, maps and 93 colour plates. Swan Hill Press, Shrewsbury.1993. £75.00

Deer are visually attractive animals which have evoked man's attention and interest for food, sport and aesthetic values for hundreds if not thousands of years. Biologically a small group of about 42 species they are nevertheless distributed throughout much of the world, with to-day, as a result of widespread introduction, much of Africa being the only extensive area from which deer are absent. Over the past fifty years our knowledge of deer has progressively expanded and with an increasing public interest, awareness and involvement in their recreational value, conservation, management and scientific study, the time is propitious for a comprehensive review of available information on these animals. No one is better qualified to provide such a review than Kenneth Whitehead, with sixty years experience of deer and well over forty years of writing on them. The review appears in the form of an encyclodpedia into which a vast amount of information is compressed into an accessible and readable format.

There are seven parts. The first and largest deals in alphabetical order with general deer-

related topics. The coverage is diverse. Anticipated subjects such as census taking, deer farming, migration, royal buckhounds and venison are complemented with various items of general interest such as artists, heraldry (over 260 families are named whose crest is a stag head erased!), philately, sculpture and deer on coinage. The accounts are succinct with good biographical support.

In Part II the world's deer species are listed. Latin nomenclatures and some common names are followed by descriptions, distributions, measurements and biology. There is a distribution map for each subspecies as well as a wealth of monochrome photographs. A short section on endangered, vulnerable and rare species is included. With four endangered species (3 in south-east Asia and one in South America) and 17 subspecies, deer, like so many other larger mammals, display considerable vulnerability to man's vagaries. As deer have been introduced into many parts of the world it is not surprising that an account of introductions occupies a further 50 pages of text.

Hunting with horse and hounds, stalking and weapons for shooting deer are covered in a short Part III. This is followed by an extensive account of deer trophies. Here, instructions are given on the preparation of mounts, how trophies are measured and scores accumulated for competition. A worldwide list of awards and medals is provided. In contrast to the rest of the book, this Part is the most specialised and only of interest to the more competitive deer stalker and hunter. Part V is a short but most useful account of diseases and parasites.

The reference Section which follows extends to over 100 pages. It includes a deer classification (which could probably have been more appropriately incorporated into Part II) and a list of common and vernacular names. This is more extensive than appears earlier, with, for example, 44 vernacular names for roe deer. A tabulated list of the distribution of wild and feral deer by geographical locality is of considerable value in enabling the reader to determine, at a glance, the deer present at a particular location. The great wealth of source material appears in the Bibliography, or more precisely fifteen separate bibliographies, all but one (General) related to a particular topic, e.g. deer stalking in Britain, deer farming, venison. Whilst this arrangement helps if one is looking up a range of references on a topic, it is less useful in locating a reference from the text.

This book is an invaluable, comprehensive, up-to-date reference on deer throughout the world. It represents a quite outstanding source which should be the standard reference work for many years to come. It is a tremendous testimony to the dedication, application and knowledge of its author. This is a book that should find its way not only on to the shelves of all deer enthusiasts but also the reference sections of many public, institutional and educational libraries. Unfortunately, it has a high price tag but is nevertheless excellent value

MJD

Bats – A Community Perspective by **James S. Findley.** Pp. 167, with 10 b/w photographs, 25 figures and 10 tables. Cambridge Studies in Ecology. Cambridge University Press 1993. £27.95

This slim volume on bats is for the bat connoisseur, for to obtain any benefit from reading it some prior knowledge of scientific bat biology is essential. For those starting out on bat research, it gives a very good introduction. Over the last three decades a great deal of bat research has been accomplished, and a number of these important findings are mentioned in this book. James Findley is an American chiropterist, from the University of New Mexico, and most of the findings in the book are American based, in spite of this book being one of a series being published in Britain by the Cambridge University Press. However, references are made to a number of important European bat studies, notably from Denmark, Czechoslovakia, Poland, Russia, Germany and Holland – but unaccountably none from Britain, although the British contribution to research into temperate climate bats is enormous, especially from such university centres as Aberdeen and Bristol.

Bats are predominantly tropical mammals, hence the book's emphasis on scientific research from these areas. James Findley would, I am sure, describe himself as a bat morphologist, making major contributions in books and scientific papers in this field of studies. After giving an overview of bat biology, and making various estimates on bat numbers, he moves into the subject of ecomorphology,which he defines as the study of the relationships between morphology and ecological behaviour, a study that arises because of the difficulties of studying ecological relationships of bats. The book contains a number of morphograms of a variety of bat species from various parts of the world. These morphograms illustrate the use of multivariate techniques in quantified morphology and trophic diversity, thus giving us a greater understanding of chiropteran diversity. The whole book helps to address the nature of bat communities and their structures.

I would recommend this book as a useful guide to those involved in bat community ecology.

MJAT

RECENT CHANGES IN BUTTERFLY DISTRIBUTION IN THE HARROGATE DISTRICT

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Introduction

A detailed 10-year investigation of the distribution of butterflies in the Harrogate and District Naturalists' Society (H&DNS) study area was carried out between 1976 and 1985 (Barnham & Foggitt 1987; referred to below as 'the 1976-85 study'). Records of 28 species of butterfly were mapped according to the 1 km squares of the Ordnance Survey (OS) grid. In addition to the expected variation in relative abundance of species year by year (Barnham & Foggitt 1987, Barnham & Foggitt 1991, Table 2) there were marked increases in the local range of several butterfly species during the study period. Similar increases in range were noted for more than 100 species of butterflies and larger moths in other parts of Yorkshire at that time (Sutton & Beaumont 1989, chapter 3). The H&DNS study area includes or lies close to the current limits of distribution of many butterfly species and is therefore well placed for the study of any changes that might occur.

In the seven years since the completion of the 1976-85 study (ie. to the end of 1992) records have shown a remarkable increase in the abundance of a number of butterfly species in the district and there has been invasion and colonisation with several species never recorded here before. A review shows that the first signs of this increase were noticed in the district in the 1960s and that there appears to have been an acceleration of the process of range expansion from the late 1970s onward. In this paper we describe and discuss these local findings.

Methods

The Harrogate district (Figure 1) includes the entire valley of Nidderdale from the moorland watersheds bordering Wharfedale and Coverdale down to the confluence of the river Nidd with the Ouse, west of York; the north-eastern boundary follows the river Ure up to Masham. The area therefore includes a variety of terrain from heather moors, grassy uplands and wooded river valleys to the lowland farming areas of the Vale of York. The district occupies 1024 one km squares on the OS grid.

Records of butterfly sightings (including locations, dates and approximate counts of adult insects) are regularly submitted by members of the H&DNS to the Lepidoptera Recorders of the Society (H&DNS Reports), and we acknowledge the valuable efforts of all who have contributed. We have been active in performing much of the fieldwork ourselves and, as the three Recorders since 1976, we have been able to apply a critical standard for acceptance of records from others. Recording in the district has been rather less intensive since the completion of the 1976-85 study.

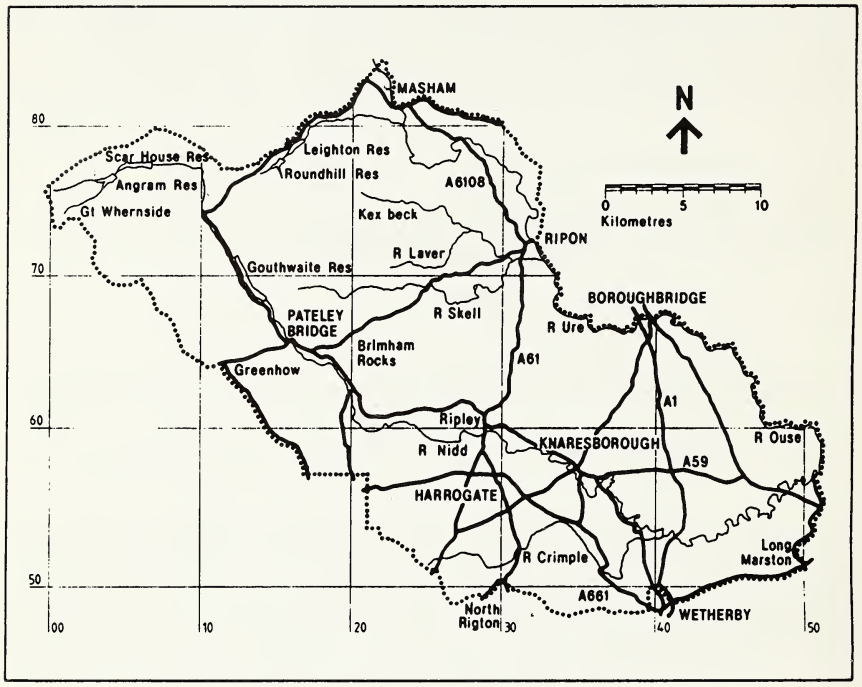

FIGURE 1
Principal towns and features in the Harrogate and District Naturalists' Society study area. The boundaries of the area are shown with a dotted line.

Observed Changes in Distribution

As judged by the records submitted during the 15 years 1978-92 (Table 1), 14 of the 30 butterfly species (47%) seen in the district have shown substantial increases in abundance (number of colonies located, number of butterflies noted at those sites and number of sightings of migrants and erratics) and/or in geographical distribution (number and spread of 1 km OS squares containing records). Butterfly species showing no appreciable overall change in distribution or occurrence during the period were either common and widespread butterflies in which a change would be less noticeable or very occasional singletons, such as Camberwell Beauty *Nymphalis antiopa* and High Brown Fritillary *Argynnis adippe*. The Dingy Skipper *Erynnis tages* has been placed in the 'no change' category but remains a vulnerable species in the district; during the 1976-85 study we located the butterfly in 21 one km OS squares but no further colonies have been found since then. Several species (including Small Tortoiseshell *Aglais urticae*, Peacock *Inachis io* and Small Copper

TABLE 1
Summary of observed changes in abundance/distribution of species during the 15 years 1978-92

Increasing	No appreciable change	Decreasing
Small Skipper	Large Skipper	White-letter Hairstreak[a]
Clouded Yellow	Dingy Skipper	
Brimstone	Large White	
Green Hairstreak	Small White	
Purple Hairstreak	Green-veined White	
Holly Blue	Orange Tip	
Painted Lady	Small Copper	
Comma	Common Blue	
Dark Green Fritillary	Red Admiral	
Speckled Wood	Small Tortoiseshell	
Marbled White	Camberwell Beauty[b]	
Gatekeeper	Peacock	
Small Heath	High Brown Fritillary[b]	
Ringlet	Wall	
	Meadow Brown	

a = the decline in this species followed a period of marked expansion in the later 1970s – early 1980s.

b = only one record of this species in the district during the period.

TABLE 2
Perceived starting dates of new colonisation/expanded distribution of species in the Harrogate district

Period starting	Species
mid1960s	Small Skipper[a]
early 1970s	Ringlet[a]
late 1970s	White-letter Hairstreak[b], Holly Blue[b]
1983-86	Brimstone[a], Green Hairstreak[c], Purple Hairstreak[a], Dark Green Fritillary[d], Gatekeeper[a]
1986-88	Comma[d]
1991-92	Speckled Wood[a], Marbled White[a]

a = new records/colonisation in the district

b = previous records in 1940s, 1950s: likely expansion of persisting local colonies

c = expansion of local colonies

d = previous records in 1940s, 1950s: likely re-invasion/recolonisation of the district

Lycaena phlaes) were markedly reduced in a number for a period of two to three years in the late 1980s, as noted elsewhere in the county (Sutton & Beaumont 1989), but they appear to have made a complete recovery. The recent decline of the White-letter Hairstreak *Satyrium w-album* followed a period of marked expansion and was clearly associated with the loss of its foodplant from Dutch Elm Disease; this appeared to be the only butterfly

species in significant decline during the recent period.

The apparent extension of range of many butterflies in or into the Harrogate district seemed to start with the unexpected first appearance here of the Small Skipper *Thymelicus sylvestris* in July 1966. The Ringlet *Aphantopus hyperantus* first appeared in the early 1970s to be followed, as shown in Table 2, by a range of other species. The process of range extension and colonisation of new sites became more marked during the 1980s and appears to be continuing into the 1990s with new records of Marbled White *Melanargia galathea* and Speckled Wood *Pararge aegeria*. Notes on individual species showing apparent range extension are given in the paragraphs below.

Small Skipper *Thymelicus sylvestris*. This butterfly was first recorded in the Harrogate district in July 1966 and has subsequently become widely distributed throughout the lower land up to Masham and Pateley Bridge. In the 1976-85 survey we located the species in 288 one km OS squares. It has become one of our most abundant butterflies and was recorded in the 'top three' in counts of adult butterflies in the district in 1981, 1984, 1985, 1986 and 1987 (Barnham & Foggitt 1991). It appears now to have saturated most suitable sites in the district and no further change in status has been noticed in recent years.

Brimstone *Gonepteryx rhamni*. There were one or two unconfirmed records of wandering adult insects in the Harrogate district in the 1960s and 1970s but confirmation finally came from the capture of a butterfly at Farnham (north of Knaresborough) in June 1983. In nearly every year since then singles have been noted between May to August, with sightings distributed over a wide part of the district from Tockwith in the east to Knaresborough, Harrogate and Ripon. There is very little of the foodplant to sustain this butterfly in the Harrogate district and we have no direct evidence of local breeding here. At least three male butterflies were seen around newly-planted buckthorn bushes at Staveley Nature Reserve (north of Knaresborough) in Spring 1992, presumably attracted by the scent. Several adult males were also seen together at a site near Cattal (east of the A1 road) in 1990 and 1991, and freshly emerged insects have been reported in late August at Goldsborough Woods, Burton Leonard (north of Knaresborough) and Newby Hall gardens.

Green Hairstreak *Callophrys rubi*. This butterfly inhabits moorland areas of the district where there is a substantial growth of bilberry; in the 1976-85 survey we located it in 38 one km OS squares. Unusual lowland sightings of the butterfly, thought to represent individuals wandering down from the moors in years of plenty, were recorded in the mid-1980s at Harrogate, Markington and Farnham. On 5th and 6th May 1990, when moorland colony counts showed unprecedented high levels for the district, singles were recorded at Farnham gravel pit and Ellington Banks (north-west of Ripon), and three were seen together at Staveley. In 1992 the butterfly was again recorded at Staveley (two specimens), suggesting that low density breeding could be occurring there.

Purple Hairstreak *Quercusia quercus*. Porritt (1883) recorded this species as quite widely distributed in Yorkshire during the19th century but there were no known colonies at that time in the Harrogate district. Known strongholds in the county in more recent years have been to the east and south of York (Sutton & Beaumont 1989). The butterfly was first discovered in the Harrogate district in 1983 in Goldsborough Woods and adults have been noted flying in the oak canopy there in most subsequent years; in 1986 it was recorded at Spa Gill above Fountains Abbey. Sighting at other locations in the district have increased dramatically during 1990-92. Records are now established in 38 one km squares, particularly in the eastern part of the district where the butterfly has been found in most major blocks of woodland and on roadside and hedgerow stands of oak from Cowthorpe (near Wetherby) to Boroughbridge. To the west it has extended at least as far as North Deighton, Birkham Wood (Knaresborough), Brearton (north of Harrogate) and Roecliffe Moor. The butterfly has been seen on the wing here from mid-July until the fourth week in August.

White-letter Hairstreak *Satyrium w-album*. This rather secretive species was thought to have been lost to the district after sightings in the mid-1950s but there was a strong resurgence in the late 1970s. In the 1976-85 survey we recorded the butterfly in 155 one km OS squares in a wide distribution from Wetherby to Masham, strong around Knaresborough and Harrogate, and in a few sites up the dales to beyond Pateley Bridge and Swinton Park. From the mid-1980s there has been a striking decline associated with the almost total loss of adult wych elms in the district from Dutch Elm Disease; however the butterfly is still recorded regularly in small numbers at sites where there is a vigorous regeneration of young trees.

Holly Blue *Celastrina argiolus*. This erratic species was recorded in the Harrogate district in the late 19th century and from the late 1940s to 1957. It then seemed to disappear until a strong local resurgence occurred in the late 1970s centred in mid-Nidderdale, where holly is abundant. From 1978-85 increasing records (amounting to 103 one km OS squares) in a rectangular area between Masham, Knaresborough, North Rigton and Pateley Bridge suggested expansion from this focus, making up the only substantial colony of the Holly Blue in Yorkshire at that time. Study within this area seemed to indicate that only a spring generation of butterflies occurred each year, perhaps due to an inhibitory effect of altitude (Barnham & Foggitt 1987). In August and September 1990 and 1991 widespread sightings of butterflies in ones and twos were reported from the lower land, consistent with an influx of butterflies from elsewhere, as was noted at Spurn (Spence 1991). In 1992 spring sightings of the butterfly were reported from many parts of the lower land together with a showing in normal numbers in the mid-Nidderdale colony. In July to September 1992 the butterfly gave a strong showing throughout the lower land (although none were reported from the mid-Nidderdale area) and larvae were subsequently found in ivy, indicating successful breeding from the second generation in the district.

Comma *Polygonia c-album*. The presence of this species in Yorkshire has been described as 'volatile' as it has hitherto proved unable to sustain itself here for periods of more than a few years. Following records in the east of our district in the 1870s (Porritt 1883), singles were reported in Harrogate in 1945, 1946 and 1948. In 1986 a single butterfly was observed at High Batts Nature Reserve; one to three widely distributed sightings in August and September were then recorded in each of the years 1987, 1988 and 1990. In 1991 there were nine late summer sightings from the Nidd valley between Hunsingore (east of the A1 road) and Glasshouses (near Pateley Bridge). In 1992 there were 75 sightings recorded throughout the district including a spring appearance of hibernated butterflies, a strong July-August showing of *var. hutchinsoni* butterflies (up to six adults seen together in certain woodland locations) and a widespread but rather weaker showing of the autumn butterflies in October.

Dark Green Fritillary *Argynnis aglaja*. The species was noted in the 1950s, sometimes plentiful, in woods and grassland to the north and east of Knaresborough and at Grantley (west of Ripon); the last sightings at that time were in 1960. In 1984 and 1985 the butterfly was rediscovered in three moorland locations, including the quarries at Greenhow (several insects seen there in both years) and above Roundhill Reservoir. Those colonies appeared not to persist but individual, wandering fritillaries proven or assumed to be of this species were subsequently noted in July and August at High Batts Nature Reserve (north of Ripon) (1988) and on a road embankment beside the A1 to the east of Knaresborough (1992). The source of these butterflies has not been determined.

Speckled Wood *Pararge aegeria*. During the 1980s this species extended its range in Yorkshire within the confines of the magnesian limestone belt which runs through vice-counties 63 and 64 (Sutton & Beaumont 1989), For some years the butterfly was known to occur a few miles outside the south-eastern boundary of the H&DNS study area but our first records, in 1992, showed a sudden deep penetration into the Harrogate district including Ripon Parks (in June), Goldsborough and Ribston Woods (several records in

August), Wetherby (August) and the Woodlands area of Harrogate (October).

Marbled White *Melanargia galathea*. The long-established colonies on the Yorkshire Wolds constitute the only stronghold of this species in north-east England (Rafe & Jefferson 1983). The first record in the Harrogate district was an unexpected sighting in July 1985 of a butterfly on embankments near the A1 road to the east of Knaresborough. Further July records have followed, in a woodland clearing east of Little Ribston (1991) and in grassland at Staveley (1992). These three locations lie within 9 km of each other and are all close (maximum 4 km) to the A1 road; the possibility of introduction from loads carried on the road (such as by larvae on grass in agricultural vehicles) deserves consideration, although the butterflies might otherwise have flown here from the Wolds colonies (a distance of 40 km).

Gatekeeper *Pyronia tithonus*. Formerly restricted to the south and south-east of the county, this butterfly has greatly extended its range since the early 1970s (Sutton & Beaumont 1989). The first confirmed record in the Harrogate district was in July 1983 at Wetherby; adults were noted in small numbers in each of the following four years in the south-eastern part of the district between Wetherby, Long Marston, Nun Monkton and Knaresborough. There were no records here for 1988 and 1989 but subsequently the species has returned in stronger numbers, colonising certain ditches, hedgerows and woodland edges over a wide area of our eastern land and extending to Pannal (west of Harrogate), Ellington Banks and the High Batts Nature Reserve.

Small Heath *Coenonympha pamphilus*. Strong and diffuse colonies of this butterfly are found in upland areas of the Harrogate district (Barnham & Foggitt 1987). The species is very rarely seen in our lower land except for a few self-contained colonies in disused quarries to the north of Knaresborough. In the mid to late 1980s wandering butterflies were noted to the east of these areas, at Flaxby road embankments, Ribston Woods and the riverside at Aldwark. We are not aware of any new colonies resulting from this activity.

Ringlet *Aphantopus hyperantus*. This species was first recorded in the Harrogate district at High Batts Nature Reserve in the early 1970s. This remained the only known colony in the district until 1982-85, when an extensive invasion was noted throughout the length of our eastern and north-eastern boundaries. By the end of 1985 the species had been recorded in 113 one km OS squares throughout the lower land of the district and as far west as Harrogate, Fountains Abbey and Masham. Many strong colonies were established in wooded and grassy areas and the species has held its ground in subsequent years. In 1987, the Ringlet was third in order of numerical abundance of all the butterflies counted in the Harrogate district (Barnham & Foggitt 1991). The furthest extension of the butterfly westward was noted in the late 1980s at Lofthouse (above Pateley Bridge) where an isolated colony has now persisted for several years.

Migrants:

The Clouded Yellow *Colias croceus* has been recorded in the district in three of the last 10 years, with some 165 sightings of the butterfly. Before this there had been a gap of 35 years without a single record here.

The Painted Lady *Cynthia cardui* is noted here almost every year in variable but usually very small numbers. From the mid-1980s an increased number of reports has been noted and in 1980 and 1988 the butterflies were exceptionally numerous in the district.

Discussion

When assembling and interpreting entomological data such as this, certain limitations should be borne in mind. These include (1) the difficulty of accuracy of identifications – as Recorders for the district we have maintained a cautious and critical approach, and have visited the sites ourselves whenever possible to verify unusual sightings; (2) the possibility that secretive butterflies, such as the White-letter Hairstreak, and those that might subsist for years in small numbers in country areas, such as Holly Blue and Dark Green Fritillary

might well have been present in the district during the intervening years between major appearances, when there were no records; (3) the fact that only a small proportion of the individual butterflies occurring in a district are ever seen and reported and that, in most cases, novel movements and colonisations probably occur some time before they are actually noticed.

Despite these reservations it is clear that recent conditions have been highly favourable for most species of butterfly here, resulting in high population counts in existing colonies and a striking extension in the range of many species. In the Harrogate district about one half of the total observed butterfly species have shown a substantial increase in abundance and/or geographical distribution during the last 15 years and many of those with no observed change during the period (such as Peacock *Inachis io*, Orange Tip *Anthocharis cardamines* and Wall *Lasiommata megara*) have been, nonetheless, in a strong state. The change in the fortunes of butterflies noted in Harrogate correlate with, and are in general accordance with, recent records for other parts of the county (Sutton & Beaumont 1989; Spence 1991; Rimington 1992). This rapid improvement, affecting so many species in the district and most noticeable during the last five years, has been dramatic and unprecedented in modern times.

The range of previously unrecorded 'brown' butterfly species in the Harrogate district appeared to be characterised by a primary phase in which individual insects wandered sometimes 10-20 km into unheld territory, followed by a phase of consolidation in which new colonies of the insects became established. New sightings of such 'primary phase', wandering butterflies far inside the district were recorded here in the current study for Ringlet, Gatekeeper, Marbled White and Speckled Wood.

The reasons for the continuing abundance and spread of butterflies in recent years remain conjectural, but it seems likely that climatic change has played a major part. Whether this is due to natural fluctuations, such as those which presumably underlay the striking long-term alterations in butterfly distribution recorded in this country during the last 200 years (Emmet & Heath 1989; Rimington 1992), or to the more sinister possibility of 'global warming' (Sutton & Beaumont 1989) is at present uncertain.

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BOOK REVIEWS

Plant Galls by **Margaret Redfern** and **R. R. Askew.** Pp. 99, with 4 colour plates. Naturalists' Handbooks No. 17, Richmond Publishing Co. 1992. £8.95 paperback.

This is a splendid book. It is difficult to see how 99 pages could have been better used to augment the scanty English literature on plant galls.

Throughout most of the book the left hand third of each page is devoted to very clearly drawn and plentifully captioned illustrations to the text. These are especially valuable in the gall identification section where virtually every gall described, and many gall causers, larvae and adults, are figured. Three coloured plates of galls and one of parasitoid wasp adults are an attractive feature. Two and a half pages introduce the galls and explain what is and what is not included among them. There follow twenty well illustrated pages on gall makers. For the purpose of this book this means the arthropods – insects and mites; it excludes viruses, bacteria, fungi and nematodes.

Gall communities and interactions (13 pages) are a subject in which the authors themselves have led research. It is emphasised that much still needs to be discovered and useful lines of research are suggested.

Authorities for scientific names are given throughout and where there are taxonomic problems, as with some of the gall mites of *Acer* and *Betula*, the reader is warned.

The longest section of the book, "Identification", comprises 50 pages, of which 38 refer to the galls and their causers and the rest to parasitoids and predators. To make this possible within the size of the book, the authors have restricted themselves to 12 host plant genera: *Acer*, *Arctium*, *Betula*, *Carduus*, *Centaurea*, *Circium*, *Picea*, *Populus*, *Quercus*, *Rosa*, *Salix* and *Taxus*. Within these genera the coverage is thorough, something not to be found elsewhere in English.

This book would, indeed, be well worth its price if it contained nothing but the 12 pages of the key to oak galls. All the rest adds up to a fine introduction to the study of plant galls and far the best keys available for galls of hosts of the selected genera.

KGP

Pollution Monitoring with Lichens by **D. H. S. Richardson**. Pp. iv + 76, + 4 pp. full colour illustrations. 1992. Naturalists' Handbooks 19. Richmond Publishing Co., Slough. £7.95 paperback.

The Naturalists' Handbooks series goes from strength to strength, and David Richardson has produced a worthy addition to their list in this concise, informative and attractively presented manual of pollution detection and mapping using lichen monitors.

A watermark feature of the series is approachability for the non-expert and newcomer, whose needs are well catered for here by a brief introduction to the nature of lichens (with helpful glossary) and to the history of their role in pollution studies. This introduction is supported by an easy-to-use dichotomous key to those lichens on trees commonly used to indicate air pollution levels. The user-friendliness of this key for those new to lichens is increased by the presence of four pages of colour illustrations, reproducing each species from Clare Dalby's excellent colour chart, 'Lichens and Air Pollution'.

The reader is thus well equipped for the main body of the book. a set of sections dealing respectively with: sulphur dioxide and acid rain; ozone and nitrogen compounds; fluorides; aromatic hydrocarbons; metals (including geobotanical prospecting); lichen transplant studies; radioactive elements; melanism in moths and microfaunal distribution. In each section the effect of the pollutants on lichens and the techniques used to assess them are described in a text refreshingly free of jargon. Numerous marginal illustrations and well chosen references to the wider literature fulfill the author's aim of selecting "studies from the different parts of the world that illustrate the variety of possible approaches using lichens as pollution monitors".

The usefulness of this delightful kaleidoscope of a book to the naturalist wishing to gain an appreciation of the role of lichens in pollution studies cannot be overstressed. In particular, it is an essential buy for any instructor concerned with relevant student projects, whose scientific performance levels it will improve enormously. Although the price may prevent many present day educational budgets from running to the desirable copy per student, there should certainly be copies available for any class in biology or environmental sciences. This is *the* book to buy for an overall view of the subject.

AH

NOTES ON THE EMPIDOIDEA (DIPTERA) OF THE LOWER DERWENT VALLEY

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The dipteran superfamily Empidoidea comprises Dolichopodidae, together with Hybotidae, Atelestidae, Microphoridae and Empididae, the latter four having been treated as a single family (Empididae), until reviewed by Chvála (1983).

The superfamily as currently defined comprises in excess of 630 British species, amounting to approximately 10% of our fly fauna. Individuals range in size from about 1mm. to about 14mm. and many are of a generally dark colour; some, however, are yellow, and many of the Dolichopodidae are metallic green.

The larval habits are largely unknown, but it is thought that many species develop as predators in mud or soil. The adults, too, are chiefly predaceous and many species, especially those of the large hybotid genus *Platypalpus*, run around on the leaves of trees and shrubs. The swarming habit is well developed in a number of species, being particularly noticeable in the empidid genera *Rhamphomyia* and *Hilara*.

The superfamily is well recorded in Yorkshire, much of the early work being attributable to C. A. Cheetham (1875-1954); a brief account of Cheetham's collection of Dolichopodidae now at Leeds City Museum has recently been published (Crossley, 1992). In the past fifteen years many records have been submitted to the Y.N.U. by a number of dipterists, the principal contributors being W. A. Ely and R. Crossley.

This paper details some of the more noteworthy species which have been found by the present author between 1987 and 1992 in the Lower Derwent Valley, which is situated south east of the City of York within Watsonian Vice-County 61 (South-east York).

The Lower Derwent Valley as here defined is a complex of four Sites of Special Scientific Interest. These are, in the north, Newton Mask SSSI (SE/707500), near Newton upon Derwent; in the south, Breighton Meadows SSSI (SE/704330), and between these two, Derwent Ings SSSI (SE/703466-SE/703347). Derwent Ings SSSI extends for a distance of some 12 kilometres in a direct line from north to south and includes, *inter alia*, Wheldrake Ings, East Cottingwith Ings, Aughton Ings, Bubwith Ings and North Duffield Carrs Scrape and Drain. The fourth site is Melbourne and Thornton Ings SSSI (SE/745450). Part of a fifth SSSI (the River Derwent SSSI), is also included.

Historically the whole complex was situated within the East Riding of Yorkshire and now it falls within the administrative Counties of North Yorkshire and Humberside.

Three sites, Newton Mask, Derwent Ings and Breighton Meadows lie immediately adjacent to the River Derwent whose catchment is predominantly the North York Moors, whereas Melbourne and Thornton Ings is associated with Pocklington Canal, and The Beck and Blackfoss Beck which are chalk streams originating from springs on the western scarp of the Yorkshire Wolds.

The Lower Derwent Valley comprises 1089.4 hectares (2692 acres) of neutral alluvial flood meadows, mires, swamps, wet woodland and open water habitats. Much of the land is in private ownership, and within the complex lies the Lower Derwent Valley National Nature Reserve. This NNR, which is managed by English Nature, was officially declared in April 1990 and it includes 259 hectares (640 acres) owned by English Nature and 166 hectares (410 acres) owned by the Yorkshire Wildlife Trust.

Management entails the continuation of the traditional practices of hay-cutting and low intensity grazing coupled with the maintenance of high water tables. Winter flooding of the valley attracts internationally important numbers of waterfowl, and in the summer the herb-rich meadows are important nesting sites for a variety of waders and wildfowl (Dixon, in prep.).

The meadows are drained by a system of dykes and smaller field drains. Water remains in many of the dykes throughout the year; the flow is generally slow and there is much aquatic and marsh vegetation along the edges.

The best known part of the NNR is the Yorkshire Wildlife Trust reserve at Wheldrake Ings, where there are three public bird hides which can be reached via the riverside footpath. Further public hides have been provided by English Nature; two are at Bank Island, north of Wheldrake Ings and a third is at the southern end of the valley overlooking North Duffield Carrs.

All grid references quoted in this paper relate to the approximate centre of each site. These are as follows:- Aughton Ings SE/699388; Bubwith Ings SE/705370; East Cottingwith Ings SE/697412; North Duffield Carrs Scrape and Drain SE/698370; Thornton Ellers SE/730455. All the foregoing lie within the NNR. In addition, a further site, Sutton Wood (SE/710485) near Sutton upon Derwent, is also included in this study. This is currently owned by the Forestry Commission and is managed as a mixed plantation of approximately 38 hectares. There is some botanical evidence to indicate that the wood is of ancient origin; probably the most interesting feature is the extensive growth of Wild Daffodil (*Narcissus pseudonarcissus* L.).

Of the 171 species recorded between 1987 and 1992, 17 are currently awarded provisional national rarity classifications of 'RDB' or 'Notable' (Nb), as defined by the former Nature Conservancy Council (Falk, 1991). Five species are here recorded for the first time in Yorkshire, and a further 55 are new to vice-county 61.

Comments on the more significant species follow, new County records being indicated by a † and new vice-county records by a *. At the end of the comments section are listed additional common and generally widespread species which are here recorded for the first time for vice-county 61. Complete species lists and detailed distribution records are deposited with the York Office of English Nature, North-East Region.

Nomenclature follows Kloet & Hincks (1976) with some up-dating.

* *Platypalpus articulatoides* (Frey) Nb. Single examples of this recent addition to the British List were taken at Thornton Ellers 17.vii.89 and 10.viii.92. The first record for Yorkshire was Moorends, Thorne (v.c.63) 30.viii.83, R.C. It has also been recorded at Castle Howard (v.c.62) 9.vii.88, W. A. Ely, and Drax Hales (v.c.64), W. A. E.

* *P. cothurnatus* Macq. Nb. Aughton Ings 22.vi.87; subsequently at Breighton Meadows, Thornton Ellers and Sutton Wood. This species is widespread and not uncommon in Yorkshire, having been recorded from all five vice-counties in thirty-seven of the 10km squares. If the 'Notable' provisional national rarity classification (defined as a species estimated to occur within the range of sixteen to one hundred 10km squares nationally), correctly reflects the national status, then Yorkshire is probably its stronghold in Britain.

P. excisus (Beck.) RDB3. Single specimens were taken at Sutton Wood 25.v.91 and 27.v.91. The species was first reported in Yorkshire from Niblum Quarry (v.c.63) 14.viii.82, W.A.E.; subsequent records are Chafer Wood (v.c.62) 28.v.88 and Towthorpe (v.c.61) 26.v.90, W.A.E., Beningborough (v.c.62) 17.vi.91, R.C.

* *P. mikii* (Beck.) RDB3. A single specimen at East Cottingwith Ings 10.vii.89. This species is associated with ancient woodland sites elsewhere in Yorkshire (e.g. Bishop Wood, Selby; Terrace Wood, Rievaulx; Fountains Abbey; Hudswell Woods, Richmond). There is a small area of old woodland in the north-east corner of the Ings from which the specimen may have originated.

† *P. politus* (Coll.) Nb. A single specimen swept from a bush at the side of Bubwith Drain 15.vii.92.

P. praecinctus (Coll.) Nb. North Duffield Carrs Drain and Bubwith Ings 14.viii.92. Also Eastrington, near Howden (v.c.61) 22.vii.92, R.C. The first reported occurrence of this species in Yorkshire was from the R.S.P.B. reserve at Blacktoft Sands (v.c.63) 18.vii.89, R.C., and the first for v.c.61 was from Haverfield Reserve, Patrington 24.vi.90, A. Godfrey.

* *Euthyneura gyllenhali* (Zett.) Nb. Sutton Wood, frequent during 1991. This species was introduced to the British list on the basis of specimens collected by F. W. Edwards at Pateley Bridge in 1924 (Collin, 1961: p. 301). Since then there have been woodland records in ten of the County's 10km squares, in all vice-counties except 65.

* *E. halidayi* Coll. Nb. Thornton Ellers 20.v.88, and subsequently at East Cottingwith Ings, Wheldrake Ings and Sutton Wood. This is a little-recorded species in Yorkshire, the other localities being Terrace Wood, Rievaulx (v.c.62), Pot Riding Wood (v.c.63), Rougemont Wood, Weeton, and Colt Park Wood (v.c.64).

Rhamphomyia (s.g. *Pararhamphomyia*) *filata* Zett. Thornton Ellers 29.v.87 (1m.). The first Yorkshire record for this species was Austwick (v.c.64) 4.vi.21, (presumably C. A. Cheetham). There is also an undated record for 'Ingleborough (F.W.E.)', (? F. W. Edwards), probably in the 1920s; and Allerthorpe (v.c.61) -.vi.26, (W. J. Fordham). It was not reported again until 2.vi.84, Askham Bog, York (v.c.64) and at the same place 14.v.88; it was also taken at Timble Ings, Otley (v.c.64) 23.vi.84. (all R. C).

† *R.* (s.g.*P.*) *physoprocta* Frey RDB1. This small but distinctive empidid was found in two places at Wheldrake Ings 3.vii.90 and 6.vii.90. One site was adjoining the old course of the River Derwent, where the flies occurred in numbers on waterside bushes, and the second site was on bushes at the side of a large dyke several hundred yards distant. Males were swarming in flight at the latter site 11.vii.91 and a single female was found there 22.viii.92. This species appears to be an extremely rare fly, known from two or three localities in Hampshire and one in Norfolk, and in all cases as singletons only (Dr. S. G. Ball *pers.comm.*).

* *R.* (s.g. *Rhamphomyia* s.s.) *laevipes* (Fall.) Newton Mask meadow 5.v.90, and Wheldrake Ings at about the same time, where the species was present in quantity at hawthorn blossom. Until 1990 the only Yorkshire record was from the Malham Tarn area where it was reported by A. Brindle as being frequent in June during the Y.N.U. survey between 1954 and 1958 (Flint, 1968: p. 85). It has also been found recently at Towthorpe (v.c.61) 26.v.90, R. C., and at Gormire (v.c.62) 28.vi.90, R. C. Several specimens were taken in Sutton Wood 14.v.91 - 27.v.91.

† *R.* (s.g. *R.* s.s.) *sulcatella* Coll. Numbers of both males and females were collected at Sutton Wood, 2.v.92 and 5.v.92. A single male was found on the bank of the River Wharfe near Ilkley (v.c.64) 14.v.92, and another male was taken at Hutton Lowcross Woods (v.c.62) 26.v.92, (both R.C.). These constitute the only Yorkshire records to date.

R. (s.g. *Holoclera*) *sciarina* (Fall.) A widely distributed but localised species in Yorkshire. Specimens taken at Wheldrake Ings 14.viii.90 constitute the only v.c.61 record apart from Hornsea Mere. There are two localities recorded in v.c.65 and six in v.c.64.

Empis (s.g. *Empis* s.s.) *bicuspidata* Coll. Widely distributed in the Lower Derwent Valley from Newton Mask meadow in the north to Breighton Meadows in the south. There is a Cheetham record for Allerthorpe Common (v.c.61) 21.vi.20 which was the first for Yorkshire. This is a localised species, being recorded from nine of the County's 10km squares, one of which is in v.c.64 (East Keswick Marsh 11.vi.88, W.A.E.), the remainder being in the lowlands of east and south-east Yorkshire.

* *Hilara anglodanica* Lundb. Sutton Wood 30.v.92; the species was also found near Howden in vii.92. Otherwise known from four widely scattered woodland sites in VCs 62, 64 and 65.

H. cingulata Dahl. Thornton Ellers 16.vi.87. This is a scarce fly in Yorkshire, being recorded from only seven widely scattered localities in all vice-counties except 65. The first Yorkshire record was from Bubwith 14.vi.19, W. J. Fordham (det. J. E. Collin).

* *H. curtisi* Coll. Thornton Ellers 29.v.87 and Newton Mask meadow 31.v.89. Like the previous species, this also appears to be scarce in Yorkshire, having been recorded from each of the five vice-counties in a total of seven 10km squares.

* *H. discoidalis* Lundb. Nb. Thornton Ellers 16.vi.87. This scarce species has been taken at other Yorkshire localities as follows: Allerthorpe Common (v.c.61) 1991, East Keswick

Fitts, Collingham (v.c.64) 1984, Beningborough, York (v.c.62) 1991, banks of R. Swale, Hudswell Woods, Richmond (v.c.65) 1992, (all R. C.).

† *H. merula* Coll. RDB1. Aughton Ings 22.vi.87, 22.vi.88, Wheldrake Ings 11.vii.91. Several specimens were taken at each site, being swept from bushes by the sides of dykes. In all cases identification of the males has been confirmed by genitalia examination. The national distribution of this species is poorly known, but there appear at present to be only three reported British localities, two of these being prior to 1921 (Cambridgeshire and Herefordshire, Collin 1961: p. 632), and one from Somerset in 1983 (Dr. S. G. Ball *pers. comm.*).

* *H. woodi* Coll. Nb. Thornton Ellers, 25.vii.87. Other Yorkshire localities for this species (all post 1980), are Beningborough, York (v.c.62), Firbeck Hall (v.c.63), East Keswick Fitts and Drax Hales (v.c.64).

* *Chelipoda albiseta* (Zett.) Thornton Ellers 29.vii.89. Also at Skipwith Common (v.c.61) 1.viii.89, R. C. Other recorded localities in Yorkshire are Thorne Moors (v.c.63) 1990, P. Skidmore; Askham Bog, York (v.c.64) 8.ix.84, 16.vii.85, 24.viii.85, R.C., Timble Ings, Otley (v.c.64) 19.viii.84, P.S., and at the same locality in 1985, R.C., Thruscross, Otley (v.c.64) 19.viii.88, R.C.

* *Hemerodromia baetica* Coll. Breighton Meadows, 1.vii.87. Typically swept from bushes at the sides of rivers or streams. Other Yorkshire records of this scarce species are as follows: River Wharfe, Otley (v.c.64) 12.viii.85, 20.vii.86, River Wharfe, Deepdale (v.c.64) 5.vii.89, River Ouse, Dunsforth (v.c.64) 28.vi.87, River Ouse, Beningborough (v.c.62) 1991, Ashberry (v.c.62) 24.viii.91, (all records R.C.).

* *H. oratoria* (Fall.) Breighton Meadows, 1.vii.87. The comments under *H. baetica* can be applied also to this species. At present there are only three other localities recorded in Yorkshire: River Wharfe, Otley (v.c.64) 26.vii.86, R.C., Drax Hales (v.c.64) W.A.E., River Swale, Hudswell Woods, Richmond (v.c.65) 2.vii.92 and 27.vii.92, R.C.

Dolichopus cilifemoratus Macq. RDBK. Aughton Ings 1.viii.87. Since the initial discovery this species has proved to be widespread from Wheldrake Ings in the north to Bubwith Ings in the south, on dates ranging from 11.vi-22.viii. Specimens are invariably found in close proximity to the dykes and field drains and this points to the larvae being either aquatic or semi-aquatic. The current status of the species in Britain is unclear, hence the 'K' designation. A single male specimen in the Cheetham Collection at Leeds City Museum has been found in the series of the closely similar species *D. festivus* Hal. (Crossley, 1992: p. 30-31). It was taken at Bubwith 25.vi.19 and thus constitues the first Yorkshire record. A single specimen was collected by G. King at Keld Head, Pickering (v.c.62) 28.vii.87 (*teste* J. H. Cole). None have been seen since then (G. King *pers. comm.*).

D. linearis Mg. Nb. Wheldrake Ings 3.vii.90 and 9.viii.90. The only other records for this species in v.c.61 are Risby 21.vii.71, and Allerthorpe Common 5.viii.89 (both R.C.). Elsewhere in the County it is known from three sites in v.c.63: Maltby Low Common, Cusworth Park, and Haywood (near Askern).

* *D. planitarsis* Fall. East Cottingwith Ings 29.v.87, 16.vi.87, 14.v.90. Other Yorkshire records of this species are : Keld Head (v.c.62) 5.vi.85, G. King; and in v.c.64, Austwick, C.A.C., Lawkland 8.v.38, C.A.C., Malham Tarn, A. Brindle.

* *Hercostomus assimilis* (Staeg.) Thornton Ellers 16.vi.87 and 25.vii.87. Known from a further eight widely scattered sites in all vice-counties except 65.

Hydrophorus bipunctatus (Lehm.) Wheldrake Ings 1.x.92. This species is recorded from a further seven widely scattered localities in all vice-counties except 65.

H. litoreus Fall. Aughton Ings 22.vi.88, North Duffield Carrs Scrape 23.vii.92, and two locations at Wheldrake Ings 24.x.88 and 22.viii.92. Spurn (v.c.61) -.vi.46 C.A.C., and Helwith Moss (v.c.64) 27.iii.36 and 5.iv.40 were the only Yorkshire records for this species until a specimen was collected at Denaby Ings (v.c.63) 26.iv.86, R.C. Specimens

can be seen skimming over the surface of small pools and, as with other members of the genus, they are most easily caught by deft use of a pond net.

H. praecox (Lehm.) Wheldrake Ings 28.viii.92. Also recorded in v.c.61 from Muston near Filey 14.vii.85, R.C., and at Spurn in the late 1940s. There are several recorded localities in v.c.63: Blacktoft Sands 20.vi.89, R.C., Thorne Moors, on canal by moor edge 22.vii.79, P.S., Carlton Marsh, Barnsley 1989, J. D. Coldwell. The only other record is from Drax Abbey Farm (v.c.64), W.A.E.

* *Thrypticus bellus* Lw. Wheldrake Ings 28.viii.92. The only other Yorkshire records are Lindley Reservoir, Otley (v.c.64) 21.vii.84, R.C., and Timble, Otley (v.c.64) 17.viii.85, R.C.

† *T. laetus* Verr. Nb. North Duffield Carrs Scrape 23.vii.92, 1m., 1f.

Thrypticus species differ in life history from other members of the Dolichopodidae in that the larvae are plant-miners, developing in the stems of Monocotyledons (Assis Fonseca, 1978 p. 48).

Rhaphium antennatum Carlier Nb. North Duffield Carrs Scrape 28.vii.92, 1m., single females at Wheldrake Ings 11.vi.92 and 28.viii.92. Previously reported from Spurn (v.c.61) in the late 1940s; the only other Yorkshire record is from Mickletown Ings (v.c.63) 27.vii.76, P.S.

* *R. elegantulum* mg. Wheldrake Ings 9.v.90 *et seq.*; North Duffield Carrs Scrape 1992. There are six further widely scattered records from all five vice-counties.

* *R. laticorne* (Fall.) North Duffield Carrs Drain 14.viii.91. Other Yorkshire records are Acaster Malbis (v.c.64) 1.vi.85, R.C., Blacktoft Sands (v.c.63) 18.vii.,89, R.C., Hay-a-Park, Knaresborough (v.c.64) 1991, R.C., Castle Hills, Doncaster (v.c.63) 1990, A. Godfrey.

R. nasutum (Fall.) Nb. Wheldrake Ings 12.vi.90. By River Derwent, Wheldrake 10.vi.92. This is a scarce Yorkshire species; there is a 1920s record for Bubwith, (W.J.F., teste J.E.C.), and three post-1985 from the Otley area (v.c.64).

Campsicnemus picticornis (Zett.) Thornton Ellers 16.vi.87; Wheldrake Ings 24.x.88 and 1990. There are only six other recorded localities in Yorkshire, all in the east and south east of the County with the exception of Sug Marsh, Timble, near Otley (v.c.64) 28.vi.86, R.C.

* *Teuchophorus calcaratus* (Macq.) North Duffield Carrs Scrape 23.vi.92. Recorded from eight further widely scattered Yorkshire localities in all vice-counties except 62.

Additional vice-county records: *Drapetis* (s.g. *Elaphropeza*) *ephippiata* Fall.; *Platypalpus annulipes* (Mg.); *cursitans* (Fab.); *interstinctus* (Coll.); *kirtlingensis* Grootaert; *maculipes* (Mg.); *verralli* (Coll.); *Leptopeza flavipes* (Mg.); *Trichinomyia flavipes* (Mg.); *Trichina elongata* Hal.; *Oedalea flavipes* Zett.; *stigmatella* Zett.; *Euthyneura myrtilli* Macq.; *Microphor crassipes* Macq.; *Rhamphomyia* (s.g. *Pararhamphomyia*) *barbata* (Macq.); *tibiella* Zett.; *Empis* (s.g. *Empis* s.s.) *aestiva* Lw.; *praevia* Coll.; *E.* (s.g. *Coptophlebia*) *albinervis* Mg.; *Hilara beckeri* Strobl; *bistriata* Zett.; *brevistyla* Coll.; *cornicula* Lw.; *fuscipes* (Fab.); *hirtipes* Coll.; *subpollinosa* Coll.; *Heleodromia immaculata* Hal.; *Chelifera precatoria* (Fall.); *Hemerodromia unilineata* Zett.; *Dolichocephala engeli* Vaillant in litt.; *Dolichopus latelimbatus* Macq.; *picipes* Mg.; *subpennatus* Fonseca; *Hercostomus celer* (Mg.); *Rhaphium monotrichum* Lw.; *Achalcus cinereus* (Hal.).

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BACKHOUSE AND THE KILLARNEY FERN: A POSTSCRIPT

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In Horsman (1992), the author reviewed the record in Lees (1888) for the Killarney Fern *Trichomanes speciosum* Willd. which reads 'D. or T. *Still* in one station is the West Riding; *James Backhouse* in litt. I cannot more precisely indicate the locality' and concluded that the record is authentic.

In an entry made in 1908 in Lees' notebooks, currently housed at the Cartwright Hall Art Gallery and Museum, Bradford, Lees notes that *T. speciosum* has been reported from a site only a few miles from the site near Bingley (Ray 1724). Lees make it clear that this site is not the same as that recorded in Ray (1724). The context suggests that Lees received this report sometime prior to 1908. The site is not detailed here because *T. speciosum* is a protected species and it is not known if it still survives at this site, in gametophyte and/or sporophyte form.

The site is not in 'D. or T. ["Don with Dearne" or "Trent tributaries"]. However, Lees (1888) is very vague about the location of the '*James Backhouse* in litt.' site. H. J. B. Birks remarks that Backhouse deliberately made his *T. speciosum* finds vague to protect the plant from collectors (Horsman 1992). No doubt he treated the reports he received in the same way.

The entry in Lees' notebook was prompted by his visit to the species rich garden of S. Margerison at Grey Gables, Calverley near Leeds. Whilst there, he also examined the

herbarium of James Caster of Masham, then in Margerison's possession. This examination prompted the entry in his notebook.

Amongst the plants listed in the garden by Lees is: 'E. [Epilobium] nummularifolium. Cum! "introd. from Backhouse's, York" by S. M. ' 'Backhouse's' is a reference to the family nursery at York. Could this be more than just a coincidence regarding Lees and his having received a report of another site for *T. speciosum* in West Yorkshire?

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BAT-FLIES (DIPTERA: NYCTERIBIIDAE) IN YORKSHIRE

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Introduction

The dipterous families Nycteribiidae, Hippoboscidae and Streblidae, the so called bat-flies, flat-flies and keds have been combined under the name Pupipara. They are permanent, obligate, blood-feeding ectoparastites on birds or mammals, taking small meals equivalent to about their own weight in blood every five days. The females do not lay eggs but nurture single larvae internally. When fully developed (at three to eight days) each larva is released and pupates immediately. Metamorphosis to the adult stage takes from 20 to 30 days or the puparia may overwinter (Hutson 1984).

Of the 250 species of Nycteribiidae currently recognised worldwide, the majority are distributed throughout the Oriental and Pacific regions with only twelve occurring in Europe. To date only three of these have been recorded in Britain (Hutson 1984) These are *Nycteribia kolenatii* Theodor & Moscona, whose preferred host is Daubenton's bat (*Myotis daubentoni*), although it is occasionally found on Natterer's bat (*M. nattereri*); *Phthiridium biarticulatum* Hermann, formerly common on the Lesser horseshoe bat (*Rhinolophus hipposideros*) and the rarer Greater horseshoe bat (*R. ferrumequinum*); *Basilia nana* Theodor & Muscona, found three times in Britain on the very rare Bechstein's bat (*Myotis bechsteini*) in Gloucestershire, Shropshire and Wiltshire, with a possible record from Kent (Hutson 1984).

Since the fate of host-specific parasites is inextricably linked with that of their hosts, it is relevant to note that the preferred host species for *P. biarticulatum* and *B. nana* are now severely restricted, declining and indeed probably endangered in Britain. Thus the long term future of these ultra-specialists as part of the British fauna is not secure.

The Yorkshire Fauna

To date only two species (*Nycteribia kolenatii* Theodor & Moscona and *Phthyridium biarticulatum* Hermann) have been identified in the Yorkshire and North Humberside region (vice counties 61 to 65).

Up to the first decade of the 20th century the only evidence of Nycteribiid flies in Yorkshire came from the pioneering bat studies of James Ingleby in Nidderdale, Arthur Whitaker around Worsbrough, Barnsley and Adam Gordon at Duncombe Park, Helmsley.

The enactment of bat protection legislation in the Wildlife and Countryside Act 1981 now requires that surveys be undertaken of threatened bat roosts and hibernation sites.

Licenced surveyors (usually members of at least 5 bat study-groups in the Yorkshire region) have now surveyed hundreds of nursery roosts or hibernation sites and handled thousands of individual bats within the Yorkshire and North Humberside region. In addition, numerous injured or abandoned juvenile bats are cared for annually by interested individuals. Despite this unprecedented level of attention by the new generation of bat-workers, surprisingly few nycteribiid puparia or adults have been encountered. This may suggest a genuine scarcity of these organisms, possibly related to recent declines in bat population levels and densities.

To encourage further investigation of these fascinating though little-studied specialist parasites, the following review draws together the few currently available records.

Nycteribia kolenati Theodor & Moscona

18.6.1906 Stainborough Park VC63 (SE/3203).

One female was taken from a Daubenton's bat netted while hunting over the 'Serpentine' lake at Stainborough Park (Whitaker 1907). The specimen is in the Rothschild collection in the BM (Nat. Hist) (Oskar 1967).

12.7.1911 Barnsley district VC63 (SE/30).

One female was taken from a Natterer's bat caught in Barnsley by A . Whitaker (Whitaker 1913). The specimen is in the Rothschild collection in the BM (Nat. Hist) (Oskar 1967).

Pre. 1928 Helmsley area VC62 (SE/6083).

Several specimens were taken from a Daubenton's bat collected (probably shot over the River Rye at Duncombe Park) by Adam Gordon (Walsh 1928).

25.11.1990 Rockley Tunnel, Barnsley VC63 (SE/3302).

Several puparia collected from crevices in the dry stonework of the tunnel walls regularly used by Daubenton's, Natterer's and Brown long-eared bats during the summer months. Two puparia hatched approximately 30 minutes after being disturbed, emergence presumably being triggered by the body warmth of the collector (Weeks 1992, E. Bennett *pers comm.*).

18.9.1991 Doncaster Railway Station VC63 (SE/5703).

Three specimens were taken from roosting female Daubenton's bat. Of these, one escaped but the others, a male and a female, are now preserved in Doncaster Museum (Howes 1992).

9.10.1992 Beverley town centre VC61 (TA/0339).

A specimen was removed from a male Daubenton's bat roosting in an office in central Beverley. At 5gm, the bat was very underweight and died shortly afterwards (T. & S. Lane *pers comm.*).

Phthyridium biarticulatum Hermann

25.12.1885 Evestone VC64 9SE/22268).

Two specimens were taken from two female lesser horseshoe bats collected by James Ingleby from Ned Hole Cave (Kelsall 1895, Grimshaw 1907) and a further eighteen were removed from a third lesser horseshoe bat obtained on the same occasion (Grabham 1899).

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OBITUARY

MARGARET REVELL SANDERSON (1924-1992)

With the sad death of Margaret Sanderson on 8th November 1992 after a long illness, bravely borne, Yorkshire has lost a dedicated naturalist and a staunch active supporter of the cause of wildlife conservation. Born in Hull in 1924, she attended Beverley High School for Girls and went on to Bedford College, University of London, where she graduated in 1946 with a degree in Modern Languages. She taught at grammar schools in Ilkley, York and finally Harrogate from 1954 until her retirement.

It was during that year, 1954, that Margaret Sanderson joined the Yorkshire Naturalists' Union and regularly attended meetings of the YNU Ornithological Section. In 1969, she was invited to join the YNU Protection of Birds Act Committee by the then secretary, Charles H. Wilson, who, incidentally, went on to be Chairman of RSPB Council. For 23 years Margaret gave long and loyal service to the Protection Committee, the last 15 as Treasurer. She was somewhat reluctant to take on this post owing to her lack of experience in financial matters, but nevertheless she valiantly and enthusiastically carried out all the Treasurer's duties during the busiest period in the long history of the YNU Protection of Birds Committee.

Also in 1954, Margaret became a member of the British Trust for Ornithology and qualified as a licensed bird ringer two years later; this stemmed from her visits to Spurn Bird Observatory during the early 1950s. She regularly attended the annual BTO Conference at The Hayes in Swanwick, Derbyshire, from 1965 onwards. In co-operation with A. F. G. Walker, she wrote a paper entitled 'Recoveries of Birds Ringed in the Harrogate Area' which was published in *The Naturalist* in 1965. From 1964 to 1979, Margaret conducted a long and detailed special study of breeding Nightjars in the Ripon area. Margaret also joined the RSPB in the early 1960s, was appointed Regional Representative in 1967 and became the principal organiser for the RSPB Film Show at the Royal Hall in Harrogate from 1968 to 1992. More locally, she joined the Harrogate & District Naturalists' Society in 1957; became its Membership Secretary and Treasurer from 1964 to 1976; was elected President 1976-1979 and was Editor of the Annual Report for the years 1979-1990.

It was in the Yorkshire Naturalists' Trust (later the Yorkshire Wildlife Trust), the county organisation for nature conservation, that Margaret made her mark and played an active role. Joining in 1957 (her membership number was only 344!), she was elected to the Council in 1970, and thereafter held a number of key posts too numerous to mention here, both in the capacity of area group leader and chairman or member of various nature reserves management committees. Not only was Margaret a member of so many Trust committees over the years, but she also represented that body in various other organisations. Moreover, Margaret was also an untiring worker behind the scenes on various projects for the benefit of wildlife, though her main interests in natural history were ornithology and botany.

Margaret Sanderson's death certainly leaves a void where the knowledge and experience of wildlife conservation and protection are concerned, and her passing deprives us of a warm-hearted, invigorating and resilient character. She will be greatly missed by a very wide circle of friends among members of various societies and organisations both within Yorkshire and nationally, but she will be remembered with affection by all who knew her. Our sympathies go to her cousins and close friends.

C. G. Varty

BOOK REVIEW

Provisional Atlas of the Crytophagidae-Atomariinae (Coleoptera) of Britain and Ireland by **Colin Johnson.** Pp. 91. Biological Records Centre, Monks Wood. 1993. £5.50 paperback. [Available from I.T.E., Merlewood Research Station, Grange-over-Sands, Cumbria, LA11 6JU; price includes postage and packing.]

In this latest addition to the series of BRC atlases, Colin Johnson of the Manchester University Museum has produced what is the culmination of 25 years of assiduous research, identification and recording of a fascinating group of beetles little known even to most coleopterists.

The very readable introduction discusses available keys, habitat preferences and collecting techniques. All the known British species of *Atomaria*, *Caenoscelis*, *Ootypus* and *Ephistemus* are presented in the familiar BRC distribution map format with the inclusion of brief ecological notes on the same page as the map, a very useful consideration for students of the group.

An important addition to the atlas section deals with distribution records on a national and vice-county basis cross-referencing to the maps. A multitude of collectors and museums are acknowledged and a bibliography and up-to-date checklist are provided.

To those of us who are actively studying this rather difficult group, this is an important work and a long awaited addition to our literature.

RJM

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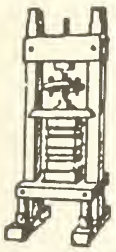

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